AMENDMENTS TO THE SPECIFICATION

Please amend the specification as follows:

Please replace the first paragraph on page 1, beginning at line 10, with the following amended paragraph:

"CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation in part of United States Application Serial Number 09/947,846, filed on 06 September 2001, which claims the benefit of U.S. Provisional Application No. 60/300,211, filed June 22, 2001."

Please delete the paragraph beginning at page 4, line 12.

Please replace the first paragraph on page 4, beginning at line 13, with the following amended paragraph:

"Fig. [[3]] 2 shows a sectional view of an alternative electrolysis cell used in the practice of the present invention."

Please replace the first paragraph on page 4, beginning at line 15, with the following amended paragraph:

"Fig. [[4]] 3 is a sectional view of another electrolysis cell having a porous anode."

Please replace the first paragraph on page 4, beginning at line 16, with the following amended paragraph:

"Fig. [[5]] 4 is a sectional view of yet another electrolysis cell having a porous anode."

Please replace the first paragraph on page 4, beginning at line 17, with the following amended paragraph:

"Fig. [[6]] 5 is a sectional view of another electrolysis cell having a porous anode and a porous flow barrier."

Please replace the first paragraph on page 4, beginning at line 19, with the following amended paragraph:

"Fig. [[7]] 6 is a sectional view of yet another electrolysis cell having a porous anode and a porous flow barrier."

Please replace the first paragraph on page 4, beginning at line 21, with the following amended paragraph:

"Fig. [[8]] 7 is a sectional view of still another electrolysis cell having a porous anode and a porous flow barrier."

Please replace the paragraph beginning at page 10, line 6, with the following amended paragraph:

"Fig. 1 ~~and Fig. 2~~ shows an embodiment of an electrolysis cell 10 of the present invention. The cell comprises an anode 21 electrode, and a cathode 22 electrode. The electrodes are held a fixed distance away from one another by a pair of opposed non-conductive electrode holders 30 having electrode spacers 31 that space apart the confronting longitudinal edges of the anode and cathode to form a cell chamber 23 having a chamber gap. The chamber 23 has a cell inlet 25 through which the aqueous feed solution can pass into of the cell, and an opposed cell outlet 26 from which the effluent can pass out of the electrolysis cell. The assembly of the anode and cathode, and the opposed plate holders are held tightly together between a non-conductive anode cover 33 (shown partially cut away) and cathode cover 34, by a retaining means (not shown) that can comprise non-conductive, water-proof adhesive, bolts, or other means, thereby

restricting exposure of the two electrodes only to the electrolysis solution that flows through the chamber 23. Anode lead 27 and cathode lead 28 extend laterally and sealably through channels made in the electrode holders 30."

Please delete the paragraph beginning at page 10, line 19.

"Fig. 2 shows cell chamber 23 and the passage 24 along the anode 21 surface. The passage 24 is a portion of the cell chamber 23, though it is shown with a boundary 29 only to illustrate its adjacent to the anode 21, and not to show the relative proportion or scale relative to the cell chamber."

Please replace the paragraph beginning at page 10, line 23, with the following amended paragraph:

"Another embodiment of the electrolysis cell of the present invention is shown in Fig. [[3]] 2. This electrolysis cell has an anode outlet 35. The anode outlet removes a portion of the electrolyzed feed solution flowing in the passage 24 adjacent the anode 21 as an anode effluent. The remainder of the cell effluent exits from the cell outlet 26, which hereafter will also be referred to as the cathode effluent and the cathode outlet, respectively. Similar electrolysis cells that remove a portion of the electrolyzed solution flowing adjacent the anode through an anode outlet are described in U.S. Patent 5,316,740, issued to Baker et al. on May 31, 1994, U.S. Patent 5,534,120 issued to Ando et al. on July 9, 1996, and U. S. Patent 5,858,201, issued to Otsuka et al. on Jan. 12, 1999. Particularly preferred is an electrolysis cell as shown in Fig. 3 of U.S. Patent 4,761,208 that uses a physical barrier (element 16) positioned between the anode and the cathode adjacent the outlet, whereby mixing of the solution adjacent the anode with the solution adjacent the cathode can be minimized or eliminated prior to removal through the anode outlet. Preferably, the cathode effluent, which will comprise a low level or no chlorine dioxide product, is passed back to and mixed into the aqueous feed solution."

Please replace the paragraph beginning at page 10, line 6, with the following amended paragraph:

"An electrode can generally have any shape that can effectively conduct electricity through the aqueous feed solution between itself and another electrode, and can include, but is not

limited to, a planar electrode, an annular electrode, a spring-type electrode, and a porous electrode. The anode and cathode electrodes can be shaped and positioned to provide a substantially uniform gap between a cathode and an anode electrode pair, as shown in Fig. 1. On the other hand, the anode and the cathode can have different shapes, different dimensions, and can be positioned apart from one another non-uniformly. The important relationship between the anode and the cathode is for a sufficient flow of current through the anode at an appropriate voltage to promote the conversion of the halite salt to halogen dioxide within the cell passage adjacent the anode."

Please replace the paragraph beginning at page 11, line 3, with the following amended paragraph:

"Planar electrodes, such as shown in Fig. 1, have a length along the flow path of the solution, and a width oriented transverse to the flow path. The aspect ratio of planar electrodes, defined by the ratio of the length to the width, is generally between 0.2 and 10, more preferably between 0.1 and 6, and most preferably between 2 and 4."

Please replace the paragraph beginning at page 12, line 27, with the following amended paragraph:

"Figure [[4]] 3 shows an electrolysis cell comprising a porous anode 21. The porous anode has a multiplicity of capillary-like flow passages 24 through which the aqueous feed solution can pass adjacent to the anode surfaces within the porous electrode. In the electrolysis cell of Fig. [[4]] 3, the aqueous feed solution flows in a parallel direction to the flow of electricity between the anode and the cathode."

Please replace the paragraph beginning at page 12, line 32, with the following amended paragraph:

"Another embodiment of an electrolysis cell having a porous anode is shown in Fig. [[5]] 4. In this embodiment, the flow of aqueous feed solution is in a cross direction to the flow of electricity between the anode and the cathode. Because the flow passages through the porous anode are generally small (less than 0.2 mm), the flow of a unit of solution through a porous anode will require substantially more pressure that the same quantity flowing through an open cell

chamber. Consequently, if aqueous feed solution is introduced into an electrolysis cell having a porous anode and an open chamber, generally the amount of solution flowing through the porous anode and across its surfaces will be significantly diminished, since the solution will flow preferentially through the open cell chamber."

Please replace the paragraph beginning at page 13, line 7, with the following amended paragraph:

"To address the above problem where the aqueous feed solution can by-pass the porous anode, the cell chamber is preferably provided, as shown in FIG. [[6]] 5, with a non-conducting, porous flow barrier 40, within the volume of the cell chamber 24 between the cathode 22 and the porous anode 21. The porous barrier 40 is non-conducting, to prevent electricity from short-circuiting between the anode and the cathode via the chamber material. The porous barrier exerts a solution pressure drop as the aqueous feed solution flows through the cell chamber. The porous barrier should not absorb or retain water, and should not react with the aqueous solution and chemical ingredients therein, including the halogen dioxide products. The porous barrier 40 can be made of a non-conducting material selected from, but not limited to, plastics such as polyethylene, polypropylene, and polyolefin, glass or other siliceous material, and silicon. The porous barrier can comprise a plurality of spheres, ovals, and other shaped objects of the same size or of different sizes, that can be packed loosely, or as a unified matrix of articles, into the chamber. FIG. [[6]] 5 shows the porous barrier 40 as a matrix of spherical objects of varying diameters. The porous barrier 40 can also be a one or more baffles, which substantially restrict the flow of the solution through the cell chamber 24. As shown in FIG. [[7]] 6, such baffles can comprise a series of vertical barriers having apertures therein for restricting the flow of solution. The restricted flow of aqueous feed solution through the non-conducting, porous barrier significantly reduces the proportion of aqueous feed solution that can pass through cell chamber, thereby increasing the proportion of halogen dioxide salt that is converted in the passages 23 within the porous anode 21."

Please replace the paragraph beginning at page 13, line 26, with the following amended paragraph:

"While the solution flowing through the porous anode and the cell chamber 24 containing the porous barrier 40 can mix and flow back and forth somewhat between each other, the effluents

exiting from the different areas of the outlet end 26 of the cell have substantially different solution compositions. The effluent 38 exiting the porous anode will have a significantly lower pH and higher conversion of halogen dioxide product than the effluent 39 exiting the cell chamber adjacent to the cathode. The effluent 38 exiting the porous anode can be separated from the effluent 39 and removed from the cell by placing a barrier 37 as shown in FIG [[8]] 7.

Please replace the paragraph beginning at page 11, line 16, with the following amended paragraph:

"The electrodes, both the anode and the cathode, are commonly metallic, conductive materials, though non-metallic conducting materials, such as carbon, can also be used. The materials of the anode and the cathode can be the same, but can advantageously be different. To minimize corrosion, chemical resistant metals are preferably used. Examples of suitable electrodes are disclosed in US Patent 3,632,498~~ and U.S. Patent 3,771,385~~. Preferred anode metals are stainless steel, platinum, palladium, iridium, ruthenium, as well as iron, nickel and chromium, and alloys and metal oxides thereof. More preferred are electrodes made of a valve metal such as titanium, tantalum, aluminum, zirconium, tungsten or alloys thereof, which are coated or layered with a Group VIII metal that is preferably selected from platinum, iridium, and ruthenium, and oxides and alloys thereof. One preferred anode is made of titanium core and coated with, or layered with, ruthenium, ruthenium oxide, iridium, iridium oxide, and mixtures thereof, having a thickness of at least 0.1 micron, preferably at least 0.3 micron."

Please replace the paragraph beginning at page 12, line 3, with the following amended paragraph:

"A particularly preferred anode electrode of the present inventions is a porous, or flow-through anode. The porous anode has a large surface area and large pore volume sufficient to pass there through a large volume of aqueous feed solution. The plurality of pores and flow channels in the porous anode provide a greatly increased surface area providing a plurality of passages, through which the aqueous feed solution can pass. Porous media useful in the present invention are commercially available from Astro Met Inc. in Cincinnati, Ohio, Porvair Inc. in Henderson, N.C., or Mott Metallurgical in Farmington, CT. Alternately US patent~~s 5,447,774 and~~ 5,937,641 gives suitable examples of porous media processing. Preferably, the porous anode has a ratio of surface area (in square centimeters) to total volume (in cubic centimeters) of more

than about 5 cm^{-1}, more preferably of more than about 10 cm^{-1}, even more preferably more than about 50 cm^{-1} and most preferably of more than about 200 cm^{-1}. Preferably the porous anode has a porosity of at least about 10%, more preferably of about 30% to about 98%, and most preferably of about 40% to about 70%. Preferably, the porous anode has a combination of high surface area and electrical conductivity across the entire volume of the anode, to optimize the solution flow rate through the anode, and the conversion of chlorite salt contained in the solution to the chlorine dioxide product."

Amendments to the Drawings:

The attached sheets of drawings replace the original sheets of drawings filed in the instant application. Fig. 2 has been deleted and the remaining figures have been renumbered.

Attachment: Replacement Sheets